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Two-patch Metapopulation Model of a Tick-borne Disease

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VCU Biomath Abstract

Lyme disease is one that is spread through the bite of an infected tick causing a range of symptoms including: fever, rash, facial palsy and severe joint pain. In order minimize the number of people that are infected with Lyme disease the amount of infected ticks would also need to be minimized. For this reason, we look specifically at groups of susceptible and infected subpopulations of ticks within metapopulations. Adding this extra subpopulation within a patch is important because it explains the population dynamics more realistically by having susceptible and infected ticks in each patch. A previous paper, *Global Attracting Equilibria for Coupled Systems with Ceiling Density Dependence*, created a two-patch model with a specified carrying capacity to see long-term behavior between metapopulations of llamas. We took this model and added the extra subpopulations and then added a disease dynamic to see how the environmental obstacle would affect the spread of the disease.